

that it belongs to the same subgenus as certain fossil forms in Oligocene and Miocene deposits of Washington and this subgenus is peculiar to that region.

A REVIEW OF CERTAIN SPECIES OF THE OLIVIDAE

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The following notes are by way of a review of a recent paper by Ph. Dautzenberg.¹ This paper is a very interesting and useful contribution toward our knowledge of the Olividae. The synonymy is very full, going back to the old pre-Linnean works of Lister, Gaultieri, Klein and others, the illustrations of which are often referred to by subsequent authors, and on these illustrations we really have to depend in determining many of the species. The paper contains many changes in nomenclature from those proposed by the writer² and E. G. Vanatta.³

The changes suggested by Dautzenberg are due (1) to the adoption of the names of Meuschen 1787 in place of those of Gmelin 1790 and Bolton 1798, (2) to considering many of Bolten's names as representing composite species, and selecting recognizable figures to represent Lamarck's species, leaving the others to stand for Bolten's species, and (3) to individual opinion as to the specific and varietal value of certain forms.

¹ Olividés de la Nouvelle Calédonie et de ses dépendances, Jour. de Conch., vol. 61, no. 1, p. 1-72, Nov., 1927, and no. 2, p. 103-147, Feb., 1928.

² Some notes on the Olividae. THE NAUTILUS, vol. 24, p. 49-51, 64-68 and 121-124, 1910-11; vol. 28, p. 97-103 and 114-116, 1915.

³ Notes on Oliva. THE NAUTILUS, vol. 29, p. 67-72, 1915.

To study a variable and widely distributed species from specimens coming from one section only, would tend to emphasize the distinctness of the more local forms, whereas, when these are studied as a whole, they would show intermediate forms that would make it impossible to consider them distinct. It is much more interesting and instructive to show to what extent species may vary throughout a given region, than to arbitrarily divide these into a number of questionable species.

My studies on this family in 1910 and 1915 were based on the collection of the late John Ford, now in the Academy of Natural Sciences, Philadelphia. In this collection is a series of over 250 specimens of the widely distributed and extremely variable species which will now have to bear the name of *Oliva erythrostoma* Meuschen, instead of *O. sericea* Bolt. Dautzenberg considers *O. textilina* Lam. (*sericea* Bolt.) and *O. tremulina* Lam. distinct species, notwithstanding the difficulties experienced by most conchologists in separating them.

The range of this species is from southern Japan to northern Australia throughout Polynesia and west to Mauritius. Coming from widely separated localities we find many local variations which, in themselves seem quite distinct, the true value of which however can only be shown by a comparison with specimens from all parts of the Indo-Pacific.

Adopting Meuschen's names and recognizing the new varieties proposed by Dautzenberg I have revised the grouping of some of the forms, with notes and references to type figures.

OLIVA ERYTHROSTOMA Meuschen.

(*O. miniacca* Bolt. *O. erythrostoma* Lam.)

Group ERYTHROSTOMA. Aperture bright red.

Var. *efasciata* Dautz. Duclos (in part) Illustr. Conch.,

pl. 15, f. 10, 11. Tryon, Man. Conch., V, pl. 26, f. 53 (only). This is what is referred in part to *porphyritica* Marr. In my paper I restricted the latter to those with bands of bright purple spots, the prevailing form of the Caroline Islands (see THE NAUTILUS, vol. 28, p. 99, 1915).

Var. *saturata* Dautz. Reeve, Conch. Icon., VI, pl. 5, f. 7c. This form has dark longitudinal lines and prominent bands giving it a sombre appearance. It represents a parallel variation to that of *fumosa* Marr. with a whitish aperture.

Var. *johnsoni* Higgins (NAUTILUS, vol. 33, p. 58, 1919). Marrat, Thes. Conch., vol. 4, pl. 7, f. 110. Dark brown with large white markings, a parallel variation to *pica* Lam.

Var. *marrati* Johns. (NAUTILUS, vol. 24, p. 51, 1910.) Marrat, Thes. Conch., vol. 4, pl. 7, f. 109. Shell entirely dark brown.

Var. *sylvia* Duclos. Illustr. Conch., pl. 14, f. 12 (only). Orange yellow with irregular lines and two bands of brown, usually smaller than the other forms.

Group TREMULINA. Aperture whitish, varying from a deep flesh color to bluish white.

Var. *sericea* (Bolten) Röding (*textilina* Lam.), Martini, Conch. Cab. II, tab. 51, f. 559. Both Bolten and Lamarck refer to the same figure here quoted. Even if Bolten refers to two figures, one representing a different species, the first reviser in the case of a composite species has the right to designate the type. This has already been done and the species again figured by Marrat in 1870 (Thes. Conch., IV, pl. 10, f. 130-132). Therefore I do not see how we can use Lamarck's name.

Var. *granitella* Lam. Differs from the typical *sericea* in lacking the two bands.

Var. *albina* Melvill & Standen. Journ. Conch., vol. 8, p. 404, 1897. An ivory white form.

Var. *tremulina* Lam. This differs from *erythrostroma* only in the color of the aperture, and in a large series it is impossible to draw a well defined line separating the two.

There are also parallel variations in both, which, aside from the color of the aperture cannot be separated, another strong indication that we are dealing with only one variable species.

O. concinna Marrat seems to be based on the young of two well marked varieties *tenebrosa* Marr. and *pica* Lam.

Var. *chrysoides* Dautz. Reeve, Conch. Icon., VI, pl. 6, f. 8d. Marrat, Thes. Conch., IV, pl. 9, f. 128. This is what most authors consider as *irisans* Lam. Orange yellow with a whitish aperture it forms a parallel variation to *sylvia* with a red aperture.

OLIVA OLIVA Linné.

The following additional varieties are recognized by Dautzenberg.

Var. *aurata* (Bolten) Röding (not Link). Duclos, Illustr. Conch. pl. 25, f. 10; Marrat Thes. Conch. IV, pl. 10, f. 134. The uniform orange yellow form.

Var. *cinnamonca* Menke, Martini, Conch. Cab. II, pl. 47, f. 501. This variety is cinnamon brown with longitudinal stripes of darker brown.

Var. *cincta* Dautz. Duclos, Illustr. Conch., pl. 25, f. 8. Tryon, Man. Conch., V, pl. 23, f. 23. Yellow with numerous narrow revolving lines of brown.

Var. *rumphi* Dautz. Reeve, Conch. Icon., VI, p. 7, fig. 10c (only). Tryon Man. Conch., pl. 23, f. 22. Dautzenberg says:—"This variety corresponds to the description and figure of Rumph." It is yellowish ornamented with lines and spots of brownish black.

Var. *albofasciata* Dautz. Duclos, Illustr. Conch., pl. 25, f. 4. Greyish, with two broad white bands bearing very irregular markings of black.

OLIVA EMICATOR Meuschen.

(*O. amethystina* Bolten. *O. guttata* Lam.)

There is one improvement in adopting Meuschen's name and this is, to have the species represented by the typical form of this beautiful shell, instead of an abnormality.

Var. *annulata* Gmel. Martini, Conch. Cab., II, tab. 50, f. 564. Whitish, with an elevated ridge near the periphery—a malformation.

Var. *carnicolor* Dautz. A flesh colored form without spots.

Var. *nebulosa* Dautz. Duclos, Illustr. Conch., pl. 16, f. 3. Reeve Conch. Icon., VI, pl. 14, f. 30d. Yellow or light brown, with large spots of dark brown.

Var. *alba* Sowerby. Küster, Conch. Cab., 2 ed., pl. 6, f. 9. Shell entirely white.

Var. *intricata* Dautz. Duclos, Illustr. Conch., pl. 16, f. 4, 17, 18. Marrat, Thes. Conch., IV, pl. 5, f. 57. With irregular lines of reddish purple and spots of very dark brown.

Var. *mantichora* Duclos, Illustr. Conch., pl. 16, f. 7, 8. Color similar to *intricata* with a more or less prominent ridge or angle near the periphery as in *annulata*.

OLIVA EPISCOPALIS Lamarck.

In making *O. episcopalis* Lam. a synonym of *O. caerulea* Bolten, I was following Marrat. The only figure of any value referred to by Bolten is that by Martini (Conch. Cab., II, tab. 48, f. 518), and that, in the absence of a description, seems very doubtful. I am therefore inclined to adopt Lamarck's name of which there is no doubt, for he says:—"remarkable for its beautiful violet interior."

Var. *lugubris* Lam. Duclos, Illustr. Conch., pl. 11, f. 5 and 6. Reeve, Conch. Icon., VI, pl. 13, f. 24 a, b. A small dark bluish form marked with white, with irregular longitudinal lines of brown, often with a dark subsutural band.

Var. *emeliodina* Duclos. Illustr. Conch., pl. 21, f. 19, 20. A small ash gray form, reticulated with five brown lines, with brown markings forming an interrupted subsutural and median band.

OLIVA RETICULATA (Bolten).

(*O. sanguinolenta* Lamarck.)

While there may be some doubt as to *O. variegata* Bolten being the same as *O. sanguinolenta* Lam., there is no doubt about *O. reticulata* and *O. sanguinolenta*, as both Bolten and Lamarck refer to the same figures by Martini (Conch. Cab., II, tab. 48, figs. 5-12, 5-13). I have therefore adopted Bolten's name.

Var. *azona* Dautz. Differs from the typical form in the absence of transverse bands.

Var. *pallida* Dautz. Duclos, Illustr. Conch., pl. 22, f. 14, 15. Whitish, reticulated with fine pale brown lines.

Var. *evania* Duclos, Illustr. Conch., pl. 22, f. 3, 4. White reticulate with pale brown lines, with a subsutural and median band of dark brown markings.

Var. *zigzag* Perry, Conch., pl. 41, f. 4. White, with clearly defined zigzag lines. The drawing seems greatly conventionalized.

OLIVA ISPIDULA Linné.

The following additional varieties are noted.

Var. *longispira* Bridgman, Proc. Malac. Soc. of London, VII, p. 195, fig. —, 1906. Luzon and Cebu, Philippines. A variety from the nearby island of Samar which I call *samarensis* in 1915 is the same. According to Dautzenburg this variety differs from the typical *O. ispidula* in having a very high spire.

Var. *oriola* Lam. The var. *gratiosa* Vanatta, 1915, is the same.

Var. *lactanea* Dautz. Marrat, Thes. Conch., VI, pl. 16, f. 253. Entirely white with a dark brown aperture.

Var. *martini* Dautz. Martini, Conch. Cab., pl. 49, f. 535. White or flesh color with a subsutural band of orange.

Var. *jayana* Ducros. Reeve, Conch. Icon., VI, p. 17, f. 34c. Spire short, white or flesh colored, with fine longitudinal lines of brown, and two more or less prominent bands of irregular markings.

OLIVA SIDELIA Duclos.

The typical form is not clearly defined as to color, and the original figures (Illustr. Conch., pl. 21, figs. 1, 2), have been copied by both Marrat and Tryon.

Var. *lepida* Ducl. Illustr. Conch., pl. 27, f. 15-21. A number of color forms are included under this variety.

Var. *todosina* Ducl. Illustr. Conch., pl. 27, f. 9, 10. Reticulated with lines of brown, and with a dark brown median band.

Var. *volvariodes* Ducl. Illustr. Conch., pl. 27, f. 11, 12. Brown with very fine darker brown lines.

OLIVA ATHENIA Duclos.

This is considered a good species by Dautzenberg, although Tryon considered it a synonym of *O. sidelia*. I have not material enough to decide.

OLIVA CARNEOLA Gmelin.

The figure cited by Gmelin (Martini, Conch. Cat. II, tab. 46, f. 495) is poor, but indicates a violet colored band below the suture. The following new varieties are proposed by Dautzenberg.

Var. *coccinata* Dautz. Duclos, Illustr. Conch., pl. 28, f. 8. The body whorl dark orange.

Var. *candidula* Dautz. Duclos, Illustr. Conch., pl. 28, f. 12, 16. Light flesh color with sometimes a white median band.

Var. *bizonalis* Dautz. Duclos, Illustr. Conch., pl. 28, f. 13. Orange with two narrow white median bands.

Var. *unizonalis* Dautz. Duclos, Illustr. Conch., pl. 28, f.

6, 14. Orange with one broad white median band.

Var. *trichroma* Dautz. Duclos, Illustr. Conch., pl. 28, f. 10, 11. A subsutural band of dark violet, a broad band of white, and a basal band of orange.

Var. *adspersa* Dautz. With small white triangular spots, more or less apparent.

OLIVANCILLARIA GIBBOSA Born.

This species seems to connect the genus Olivancillaria and Agaronia. Tryon placed it in the latter, as the suture is distinct on the spire and not covered by a callous.

Var. *flavescens* Melvill, Proc. Malac. Soc. London, VI, p. 65, 1904. This is what I called var. *aurantia*, (NAUTILUS, vol. 28, p. 103, 1915).

Var. *fulgurans* Melvill. Reeve, Conch. Icon., VI, pl. 8, f. 12b. Yellow, with longitudinal zigzag lines of brown.

Var. *candicans* Melvill. Marrat, Thes. Conch., IV, pl. 19, f. 308. This form is entirely white.

Var. *cingulata* Sowerby. Chemnitz, Conch. Cab. X, pl. 147, f. 1369, 1370. Var. *mediocincta* Melvill. This is bluish gray form, with a wide white band, bearing markings of dark brown. A rare variety or an anomaly.

NEW RECORDS OF WESTERN CANADIAN MOLLUSCA

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The mollusks mentioned in this note were collected in various parts of Western Canada during the course of an investigation of the molluscan fauna of that region. In